35 $y = x^{2/3}(x+2)$

sign graph of $y'$

$+ \ 0 \ - \ * \ +$

$\frac{-4}{5}$ $\quad 0$

$y' = x^{2/3} \cdot 1 + (x+2)\frac{2}{3}x^{-1/3}$

$0 = x^{2/3} + \frac{(x+2)}{\sqrt[3]{x}}\frac{2}{3}$

undef. at $x=0$

$-x^{2/3} = \frac{(x+2)\cdot\frac{2}{3}}{x^{1/3}}$

$-x = (x+2)\frac{2}{3}$

$-3x = 2x+4$

$-5x = 4$

$x = -\frac{4}{5}$

no abs extrema

local max $= \left(-\frac{4}{5}\right)^{2/3}\left(-\frac{4}{5}+2\right)$

local min $= 0$

Oct 20-11:43 AM

11. $y = \frac{1}{x} + \ln x$

$y' = \frac{-1}{x^2} + \frac{1}{x}\frac{x}{x} = 0$

$*$ at $x=0$

$y' = \frac{-1+x}{x^2} = 0$

$x = 1$ — not in interval $(.5, 4)$

c.p. $\cancel{x=0}$, $x=1$

e.p. $x = .5$, $x = 4$

$x=.5$ $y = 2 + \ln\frac{1}{2}$

$y = 2 + \ln 1 - \ln 2$

$y = 2 - \ln 2$

$x=1$ $y=1$

$x=4$ $y = \frac{1}{4} + \ln 4$

$= \frac{1}{4} + 2\ln 2$

$y'$ $\quad - \ 0 \ +$

sign graph $\quad .5 \quad 1 \quad 4$

$y$

Oct 20-11:54 AM

41.

$$y = \begin{cases} -x^2 - 2x + 4, & x \le 1 \\ -x^2 + 6x - 4, & x > 1 \end{cases}$$

$$y' = \begin{cases} -2x - 2, & x < 1 \quad < \text{ or } \le ? \\ -2x + 6, & x > 1 \end{cases}$$

both pieces should be equal at $x = 1$

$y'(1) = \nexists$ since pieces are $\neq$


cp $x = 1$, $x = -1$, $x = 3$

Oct 20-12:06 PM

17. $y = x^{2/5}$ $\quad -3 \le x < 1$ e.p.

$y' = \frac{2}{5} x^{-3/5}$ $\quad \nexists$ at $x = 0$ c.p.

$y' = \frac{2}{5} \frac{1}{x^{3/5}}$

$y'$: $-$ $\nexists$ $+$

-3 0 1

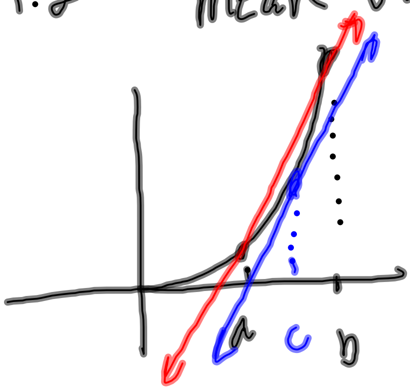
max at min at!

global max $(-3)^{2/5}$

global min 0

Oct 20-12:12 PM

4.2 mean value theorem (mvt)




if $f(x)$ is continuous on $[a,b]$ and if $f(x)$ is differentiable on $(a,b)$ then there exists a "c" between a & b so that

(slopes =) → $f'(c) = \dfrac{f(b)-f(a)}{b-a}$

tan line || secant line

Oct 20-12:18 PM

Ex1 $f(x) = x^2$ $[0,2]$ find the value that satisfies the mvt. (find "c")

$a = 0$, $b = 2$

$f'(x) = 2x$

$$f'(c) = \frac{f(b)-f(a)}{b-a}$$

$$2c = \frac{4-0}{2-0}$$

$$2c = 2$$

$$c = 1$$

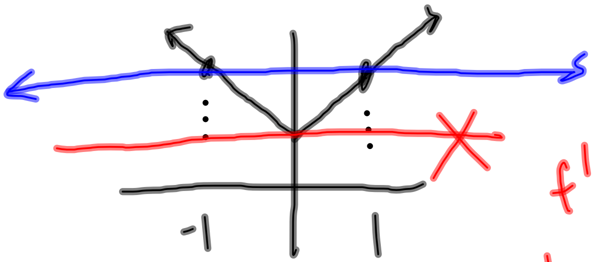
Oct 20-12:25 PM

Ex 2

$$y=\sqrt{x^2}+1 \quad [-1,1]$$

find the value that satisfies the mvt

$$y=|x|+1$$




$m_{sec}=0$

$f'(0)=\times$

not differentiable

Oct 20-12:28 PM

if $y'>0$, $y$ is increasing

(y must be continuous)
and diff.

If $y'<0$, $y$ is decreasing

on $[a,b]$

p 198

Oct 20-12:32 PM